Cryptozoology, 10, 1991, 42–54
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SOME ECOLOGICAL NOTES ON REPORTED LARGE, UNKNOWN ANIMALS IN LAKE CHAMPLAIN

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ABSTRACT: The existence of large, unknown animals known generically as "Champ" in Lake Champlain, in the northeastern United States, is indicated by isolating a behavioral pattern, nocturnality, associated with the animals. While the animals are moving, their bodies undulate vertically. Reports of multiple humps are likely to be misidentifications of multiple one-humped individuals swimming in line. The animals possibly hibernate in the ice season, and migrate within the lake during ice-free seasons. Based on inferred patterns of behavior, appropriate methods for further investigation are discussed.

INTRODUCTION

Large, unknown animals known generically as "Champ" are allegedly inhabiting Lake Champlain in the northeastern U.S.A. (Zarzynski 1988a). There are now over 300 reported sightings of these animals. In an attempt to establish their existence, the Lake Champlain Phenomena Investigation (LCPI) has conducted long term investigations since the beginning of the 1980's (Zarzynski 1982, 1983, 1984, 1985, 1986, 1987, 1988b, 1989, 1990). Despite the efforts made by LCPI and other investigators (Smith 1984, 1985, 1986, Smith and Konrad 1987), no firm evidence has been thus far obtained.

The fact that nearly ten years of investigation has failed to prove that such animals exist could be interpreted as evidence of their non-existence. Careful analyses of existing sighting reports, however, indicate that such large unknown animals, do in fact, inhabit the lake. This paper reviews some ecological factors brought to light by such analyses. The term "ecological" is used here in a broad sense, and includes seasonal migration, behavior, locomotion, and even morphology. In terms of reported behavioral patterns, appropriate methods for future field investigations are also discussed.

NOCTURNAL BEHAVIOR

Joseph Zarzynski of LCPI has compiled and published Champ sighting reports from 1609 to 1990 (Zarzynski 1988a: 154–205, 208–16, 1988b: 74–77, 1989: 70–71, 1990: 80–81). Fig. 1A shows the distribution of sighting times in these reports. Since not every sighting report includes the exact time of the event, only cases which provided specific times have been included; i.e., sightings in "late afternoon," "dusk," "about midnight," etc. were excluded. In cases where sighting time is given as a range, e.g., "7:00 to 9:00

p.m.," or as more than one time, e.g., "7:00 or 8:00 p.m.," the midpoint of range or times was plotted.

Contrary to expectation, daytime sightings are relatively unrepresented. Sightings increase after about 4:00 p.m., and take place most frequently between 7:00 and 8:00 p.m., just before sunset at Lake Champlain in summer (most sightings take place in summer). This is an intriguing pattern in terms of the expected behavior of eyewitnesses. If the animals are active throughout the daytime, more sightings should have occurred then rather than during dusk simply because there are more people active around the lake in the daytime. The steady increase of sightings from late afternoon toward sunset indicates that the animals are nocturnal.

The decrease of sightings after sunset is probably a result of the low visibility of the lake surface in darkness, and of few observers being present on or near the lake. Similarly, some daytime sightings can be interpreted as the result of anomalous behaviour by nocturnal animals, and disturbances of resting animals by approaching boats. Nocturnal behavior would explain why these animals are so elusive, despite the probable presence of a breeding colony in the lake. It should be noted that the distribution of sighting times is quite different from that of sighting times of similar unknown animals (Nessie) reported in Loch Ness, which is shown in Fig. 1B.

LOCOMOTION AND MORPHOLOGY

There are two sighting reports indicating that the animals swam like a snake, i.e., horizontal undulation of the body. However, the majority of reported sightings that include a description of locomotion (n = 8) indicate vertical undulation of the body. Six other reports state that the body undulated but without specifying whether it was vertical or horizontal (Table 1). Bonnie Clonan, of Port Henry, New York, who is encouraging local people to report sightings of the animals, has been informed by numerous eyewitnesses that the body undulated vertically (Bonnie Clonan, personal communication 1991). Thus, vertical undulation while swimming is thought to be a genuine observation. A report describing swimming "like a snake" is likely to be a misidentification or a locomotor misdescription. Vertical undulation while swimming is a characteristic locomotor pattern of modern aquatic mammals, while horizontal undulation is that of modern reptiles and amphibians. It has been argued, however, that the bodies of plesiosaurs (Halstead 1989: 38–39) and some other Mesozoic reptiles (Buffetaut 1983) undulated vertically while they were swimming.

A number of reported sightings state that the animals had "humps" on their backs. The number of reported humps on a single animal varies from one to more than ten. For reasons given below, however, it is probable that the animals have only one hump. Reports of multiple humps might be explained by multiple individuals swimming in line. The most decisive

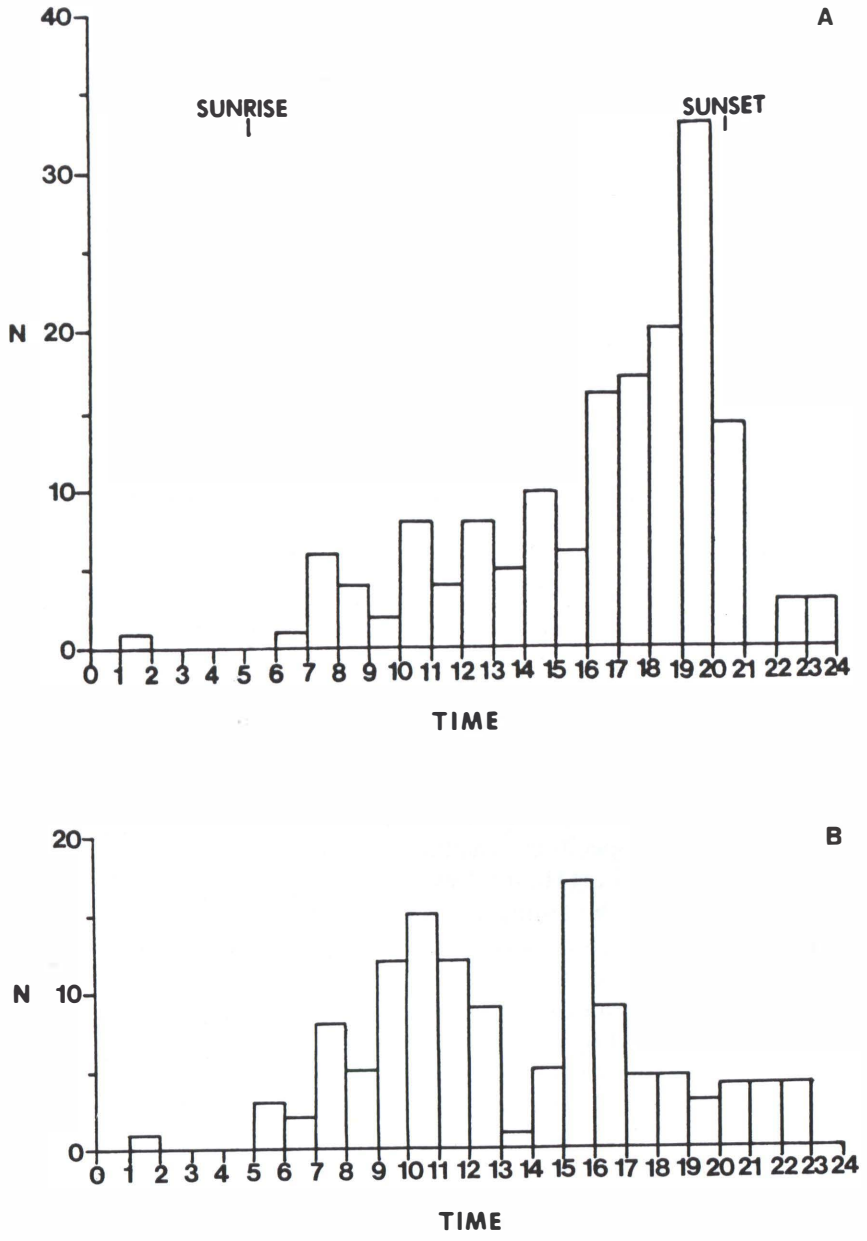

FIG. 1.—Sighting reports of large, unknown animals in Lake Champlain (A), and similar reports from Loch Ness (B), relating to time of day. (After Zarzynski 1988a, 1988b, 1989, 1990, and Mackal 1980.) Sunrise (5:11 to 5:38) and sunset (20:19 to 20:41) in July at Burlington, Vermont (United States Nautical Almanac Office 1977), are indicated.

TABLE 1.—Reported undulation during locomotion of large, unknown animals in Lake Champlain. (Based on Zarzynski 1988a, 1989.)

Sighting no.	Date	Description of locomotion
Vertical undulation		
76	October, 1961	"moving up and down"
123	1975	"moved up and down"
162	July 2, 1981	"moved up and down like a dolphin or porpoise"
170	August 15, 1981	"humps said to be rising and falling as it moved"
174	August, 1981	"swam in an up and down fashion"
263	June 29, 1985	"undulated 'similar to movement of caterpillar'"
268	August 5, 1985	"moving through the water in an up and down motion"
4	August 5, 1989	"appeared to descend in a stepping motion under the water"
Vertical or horizontal undulation		
13	August 30, 1878	"sinuous and undulating"
193	June 14, 1883	"undulating through water"
199	July 2, 1883	"humps undulated"
229	Summer, 1947	"moved in undulating fashion"
252	July 21, 1984	"undulating"
277	June 3, 1986	"3 to 4 dark humps undulating"
Horizontal undulation		
38	July, 1887	"undulations of a snake's body"
88	July, early 1970's	"swam like a snake"

evidence that indicates this possibility is the Mansi photograph, which shows only one hump present behind a head-neck rising out of the water.

In addition to this evidence, there are several reports that specifically mention sightings of two or more animals together (Nos. 186, 192, 194, 195, 201, 206, 208 and 262 in Zarzynski 1988a: 194–212; No. 4 in Zarzynski 1989: 70). One report states: "We saw what appeared to be a series of fins sticking up out of the water and moving slowly to the northeast; suddenly the 'fins' separated, and one set moved rapidly to the east about 100 yards from the first. This set disappeared after a brief time" (Zarzynski 1989: 70). Another states: "One 15 ft. long hump, then a second hump appeared which Hall [an eyewitness] believes was another Champ" (Zarzynski 1988a: 212). Because of the misidentification of multiple humps as belonging to a single animal, the sizes of the animals are frequently overestimated in sighting reports.

SURVIVAL IN THE ICE SEASON

In the winter, but mainly in February and March, the surface of Lake Champlain freezes over, though in warm years the entire surface is not frozen. On the other hand, that the animals are air-breathing is most probable

FIG. 2.—Barrage Chambly on the Richelieu River, in the town of Saint-Jean-Sur-Richelieu, southern Quebec, Canada. Any large animal moving between Lake Champlain and the sea would have to negotiate this obstruction. Photo taken in September, 1991. (Yasuchi Kojo.)

because a number of eyewitness reports state that the animals were either seen or heard blowing through their nostrils (Nos. 52, 216, 217, and 223 in Zarzynski 1988a: 164–205; No. 9 in Zarzynski 1988b: 77; No. 3 in Zarzynski 1989: 70). Four possibilities have been proposed to account for how the animals survive the ice seasons: (1) they migrate from the lake to the Atlantic Ocean via river systems; (2) they make breathing holes through the ice; (3) they stay under natural ice openings (or in underwater caves having air circulation), from where short-distance feeding forays can be made; and (4) they hibernate in underwater caves having air circulation (Zarzynski 1988a: 105–6, 138–39).

The first possibility can be rejected outright, unless one postulates locomotion over land. There are two dams and many rapids in Saint-Jean-Sur-Richelieu, southern Quebec, along the Richelieu River that connects Lake Champlain with the St. Lawrence River and eventually with the Atlantic Ocean. One of the dams, Barrage Chambly, is an artificial fall of about 15 feet (5 m) in height (Fig. 2). The other dam, Barrage Fryers, has many watergates. The depth of the rapids in most parts appeared to be shallower than 3 feet (1 m) when the author visited there in September, 1991 (Fig. 3).

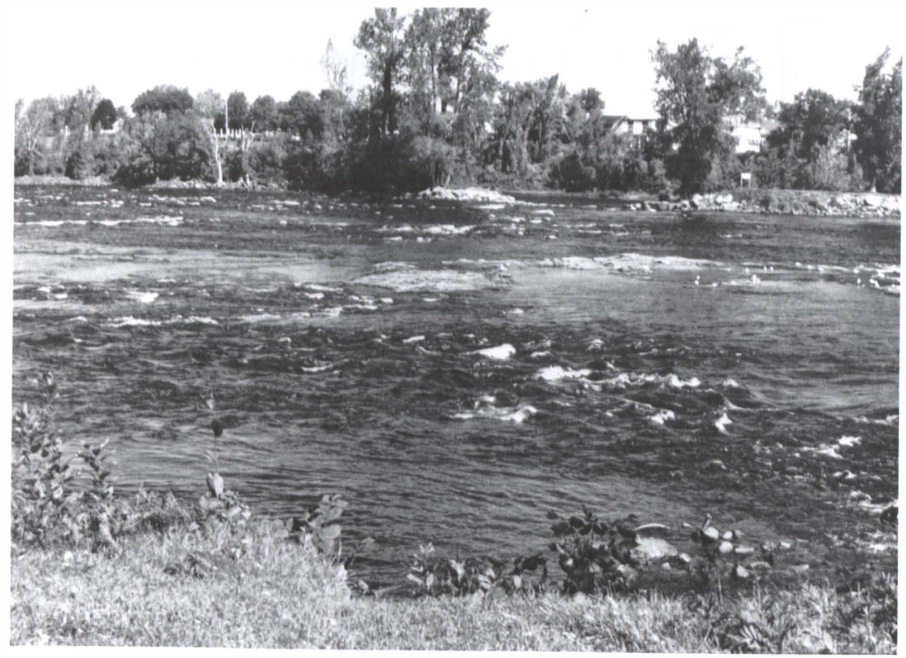

FIG. 3.—Rapids in Saint-Jean-Sur-Richelieu, southern Quebec, Canada. Photo taken in September, 1991. (Yasuchi Kojo).

In addition to these physical barriers, it should be noted that the animals in question are sighted, though not frequently, within the lake even in winter (Fig. 4).

The second possibility is also unlikely because there is only one report of one of the animals breaking ice—and no reports of an animal resting with its nostrils out of water in ice holes—although many people are active on the ice for ice fishing in several localities within the lake. The third possibility is also improbable because the animals *can* reportedly break ice for breathing air.

Because the first three possibilities seem unlikely, the fourth possibility remains as the most likely for explaining how the animals survive under the ice. It is known that caves in western New England, including the Champlain Valley, are usually located in lower Ordovician calcitic and dolomitic marbles on the slopes of the phyllitic capped hills (Quick 1979). Lower Ordovician limestone and dolostone are distributed in some localities on the side of Lake Champlain (Fig. 5). While the occurrence of phyllite in these localities is unknown, there is a possibility that openings of underwater caves are located at some of these localities.

This possibility is also suggested by the sighting report of the animal

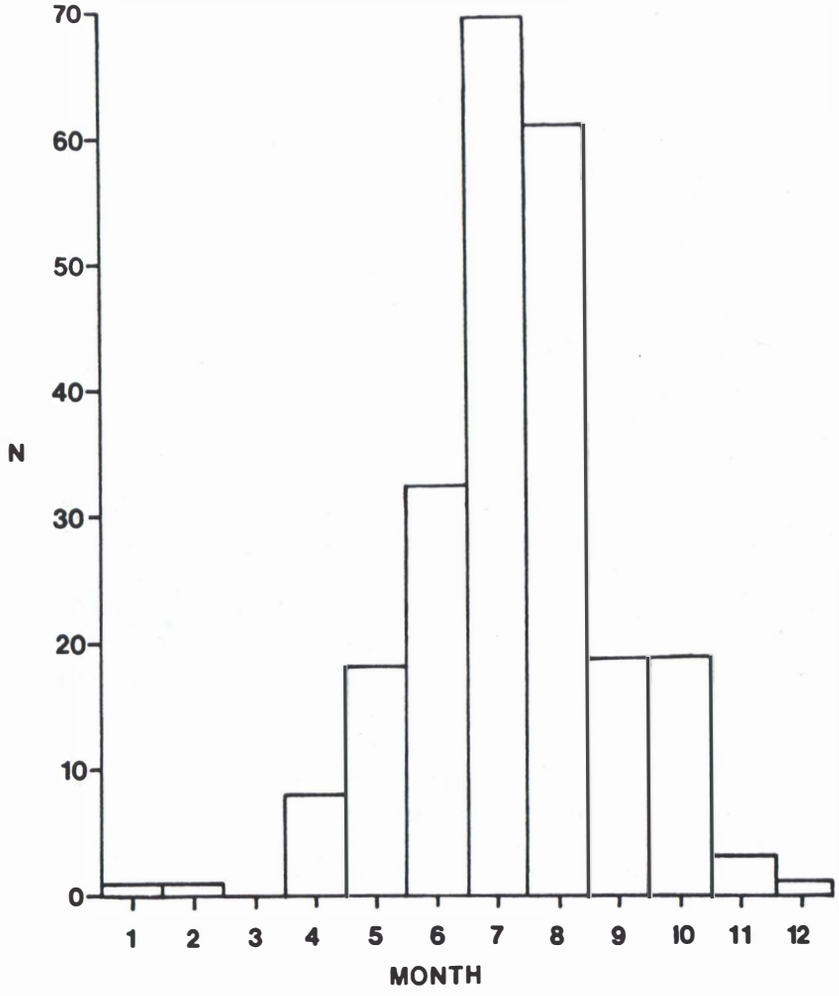

FIG. 4.—Reported sightings of large, unknown animals in Lake Champlain by month. (After Zarzynski 1988a, 1988b, 1989, 1990.)

breaking ice noted above. On February 27, 1971, "the creature broke through ice near Velez Marina (sic) and then returned under ice" (Zarzynski 1988a: 176–177). Velez Marine is located at the northern part of Port Henry. Surface geology there and in nearby Bulwagga Bay is lower Ordovician limestone and dolostone (Fig. 5). Because this is the only instance of reported ice breaking by these animals out of more than three hundred reports, it may be interpreted as anomalous behavior rather than a purposeful attempt to make air holes through the ice.

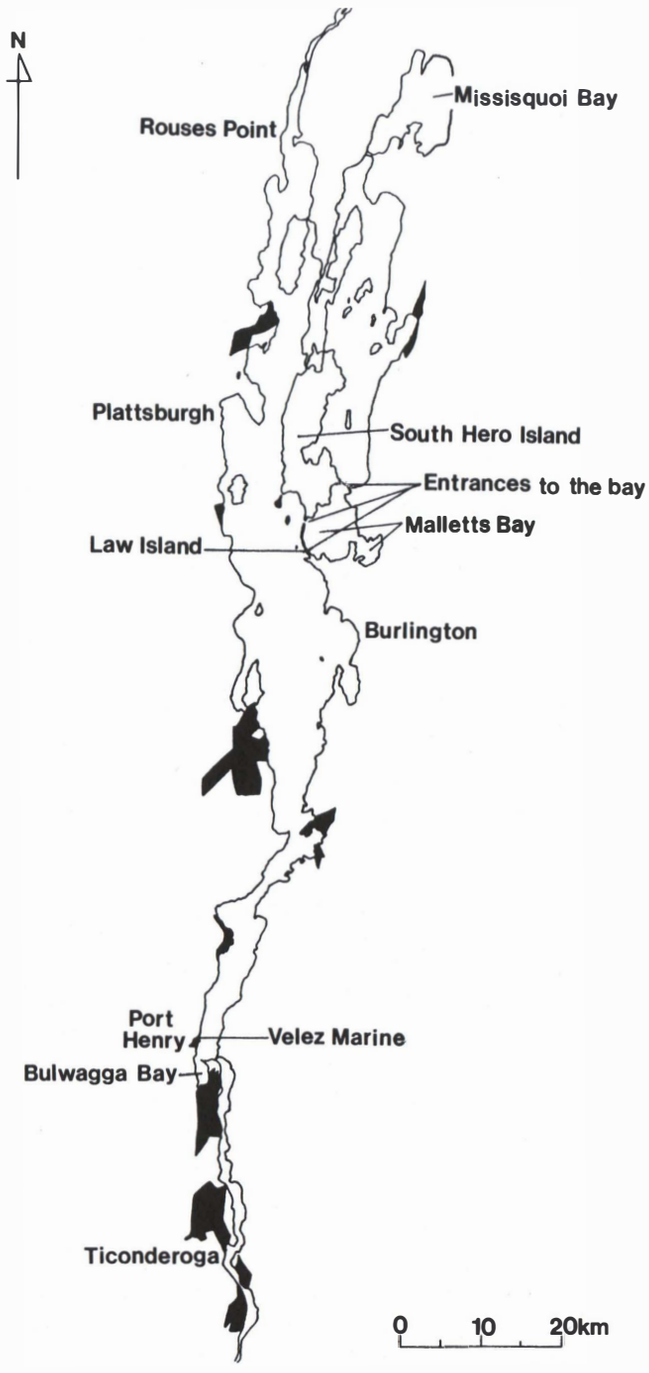

FIG. 5.—Distribution of lower Ordovician limestone and dolostone on the lakeside of Lake Champlain (blackened areas). (After Isachsen and Fischer 1970.)

Behavior in the Ice-Free Seasons

In the ice-free seasons, it is most probable that the animals subsist mainly on fish. This is supported by the number of reports stating that the animals were swimming very fast as if chasing something in the water (Zarzynski 1988a: 156–205, 208–216 *in passim*). Some other reports further strengthen this possibility: "a lot of fish were jumping out of the water surface" (Zarzynski 1990: 81); "big fish or birds were diving around the animal" (Zarzynski 1990: 81). Because several sightings have been reported from very shallow parts of the lake, such as Missisquoi Bay, which is shallower than 15 feet (5 m), and Bulwagga Bay, which is shallower than 30 feet (10 m), warm water fish may be an important food source for the animals.

There are several cases in which the animals were reported in basically the same locality over a period of a few days (Table 2). Such a pattern of sightings is most reasonably interpreted as a result of foraging behavior. The animals probably forage for fish in a specific locality for at least a few days, and then move to another locality, possibly after the fish supply in the first locality is reduced or exhausted.

Proposals for Future Investigations

Based on the preceding ecological considerations, the following suggestions for future research may be of value. In ice-free seasons, the animals are likely to be moving from one locality to another within the lake, often staying at a specific locality for at least a few days. If this is so, investigations should be conducted in a locality in which such an animal has been recently reported, hopefully within the previous few days. Because the animals are probably nocturnal and air-breathing, they may remain dormant during the daytime near the lake surface, with their nostrils protruding out of water. Such dormant animals would probably be observed more easily by an airborne observer as a large dark mass, at least in high water clarity areas. Water clarity in the lake varies substantially from one area to another largely in response to different degrees of phosphorus pollution (Fig. 6). Because noise seems to frighten the animals, and they can quietly submerge before being observed, disturbances created by motor-driven or even row boats should be avoided. Investigators would presumably have a better chance of observing the animals at night, with the minimum of noise, and with the aid of night-vision equipment.

Thus, successful investigation of these animals in the ice-free seasons is probably dependent upon 1) the speed at which sightings made by the public can be reported to investigators; and 2) the speed at which investigators can reach the sighting localities. Putting aside the second problem, the first difficulty could be overcome by the establishment of a 24-hour telephone

Table 2.—Reported sightings that occurred in the same locality within a few days. (Based on Zarzynski 1988a.) NY: New York, VT: Vermont.

Sighting no.	Date	Location
104	June, 1972	Rock Point (VT)
105	Next day	Rock Point (VT)
155	April 17, 1981	Bulwagga Bay (NY)
156	April 19, 1981	Port Henry (NY)
177	May 27, 1982	Bulwagga Bay (NY)
178	May 29, 1982	Bulwagga Bay (NY)
205	August 10, 1983	St. Albans Bay vicinity (VT)
206	August 12, 1983	St. Albans Bay vicinity (VT)
208	August 16, 1983	Fort Cassin Point (VT)
209	August 18, 1983	Fort Cassin Point (VT)
223	May 21, 1984	Off Popasquash Island, between island and shore (VT)
224	May 23, 1984	Off Popasquash Island, between island and shore (VT)
263	June 29, 1985	Near Basin Harbor (VT)
264	June 30, 1985	Mile Point (VT)
269	August 8, 1985	Mullen Bay (NY)
270	August 9, 1985	South of Mullen Bay (NY)
292	September 12, 1987	Treadwell Bay (NY)
293	September 13, 1987	Treadwell Bay (NY)

"hotline," and encouraging local residents and tourists through various media to call in their sightings as quickly as possible.

It should be noted that Lake Champlain has some advantages for observing these large aquatic animals. In some parts of the lake, the entrances to a catchment area are so few and so narrow that it is technically possible to temporarily close them for trapping purposes. This would allow photography and filming while the animal is trapped in the catchment area. For instance, Malletts Bay, located to the north of Burlington, Vermont, has only three very narrow entrances. Of these, the entrances located near Law Island and the southeastern edge of South Hero Island are possibly too shallow—4 feet (1.2 m) or shallower—for the animals to pass through. The other entrance is located near the southern edge of South Hero Island and is deep enough, about 10 feet (3 m), for the passage of such animals. Yet its width is only about 100 feet (30 m) or so (Figs. 5 and 7). Such animals have been frequently sighted inside the bay: in about 1900, 1952, 1981, 1989 and 1991 (Zarzynski 1988a: 164–65, 168–69, 210, 1989: 70, personal communication 1991). It should be noted that water visibility in Malletts Bay is still very high; Secchi clarity depth was 16 to 17 feet (5 to 5.2 m) in 1990 (Fig. 6).

During the period in which the lake surface freezes, the animals may

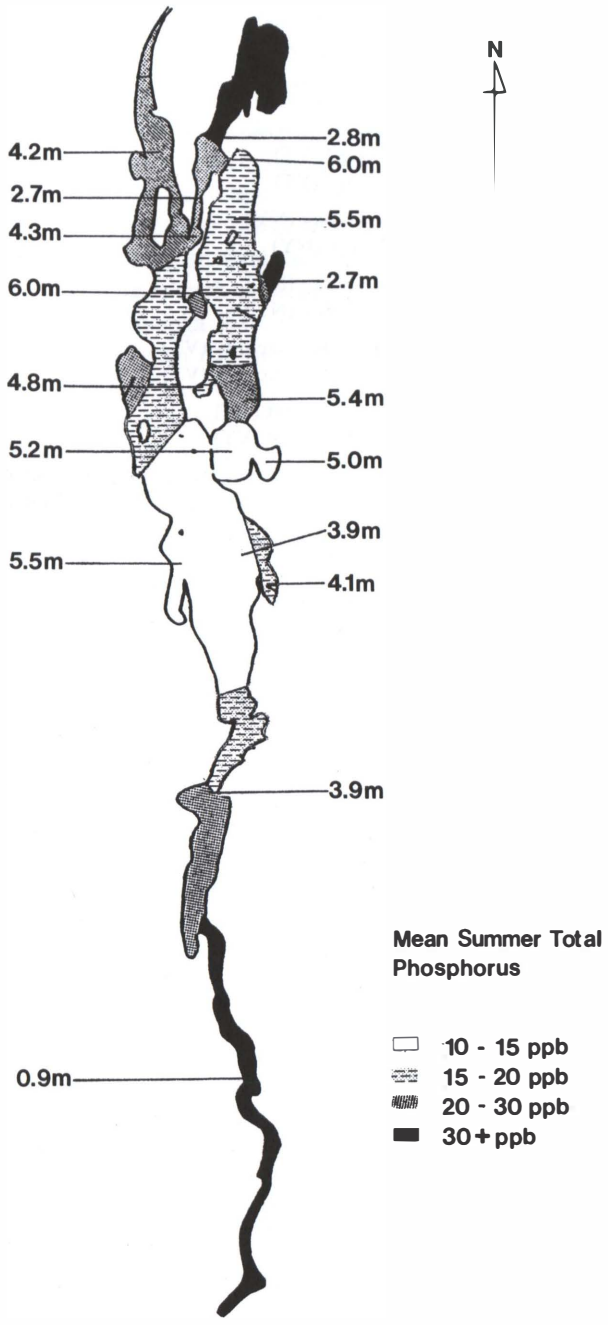

FIG. 6.—Secchi clarity depth (1990) and mean summer total phosphorus in Lake Champlain. (After Lake Champlain Committee, n.d., and Lohner and Warren 1991.)

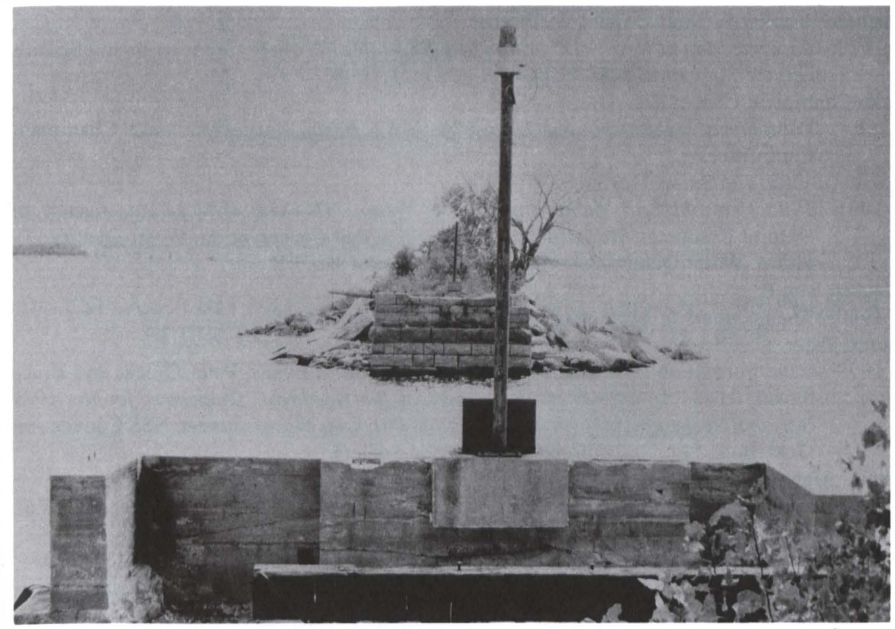

FIG. 7.—The entrance to Malletts Bay near the southern edge of South Hero Island. Photo taken in September, 1991. (Yasuchi Kojo.)

hibernate in underwater caves with air circulation. If the openings to such underwater caves could be successfully located, the animals could be observed entering or leaving the caves before and after the lake freezes over. Also, the hibernating animals in the caves could possibly be observed by an underwater robot. Localities in which underwater caves might exist can be narrowed down by a study of the surface geology of the lakeside. The search for such caves would best be conducted by an underwater robot. However, it is technically feasible to search for them in some localities by scuba diving.

Thanks are due to the following individuals and institutions for their help during this study: Robert Brown, Bonnie Clonan, Richard Greenwell, the Lake Champlain Committee, Tyron Philppot, James Spoonermore, Ron Van Slooten, and Joseph Zarzynski.

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